

## ABSTRACT OF THE DISCLOSURE

- Methods of performing cycloadditions are described that include (a) combining a first reactant and a second reactant in a hydrogen bonding solvent to form a reaction mixture; and (b) reacting the first reactant and the
- 5 second reactant to form a cycloadduct. Methods of performing asymmetric catalytic reactions are also described that include (a) combining a first reactant, a second reactant, and a catalytic amount of a chiral hydrogen-bond donor in a solvent to form a reaction mixture; and (b) reacting the first reactant and the second reactant to form an enantiomeric excess of a reaction product.
- 10 Reaction mixtures corresponding to these methods are also described.